

What is claimed is:

1. A method for manufacturing a semiconductor device comprising the steps of:

5 performing a heating process on a first semiconductor film to form a second semiconductor film;

irradiating laser light to the second semiconductor film to form a third semiconductor film having a plurality of convexes; and

10 irradiating intense light to the third semiconductor film to form a fourth semiconductor film.

2. A method for manufacturing a semiconductor device according to claim 1, wherein the intense light is irradiated
15 from above the substrate, from below the substrate or from above and below the substrate.

3. A method for manufacturing a semiconductor device according to claim 1, wherein the intense light is selected from
20 the group consisting of infrared light, visible light and ultraviolet light.

4. A method for manufacturing a semiconductor device according to claim 1, wherein the intense light is light emitted

from a lamp selected from the group consisting of a halogen lamp, a metal halide lamp, a xenon arc lamp, carbon arc lamp, high-pressure sodium lamp or high-pressure mercury lamp.

5 5. A method for manufacturing a semiconductor device according to claim 1, wherein an atmosphere within a process chamber when irradiating the intense light is a reducing gas.

10 6. A method for manufacturing a semiconductor device according to claim 1, wherein the laser light is emitted a laser selected from the group consisting of an excimer laser, a YAG laser, a YVO₄ laser, YAlO₃ laser and YLF laser.

15 7. A method for manufacturing a semiconductor device comprising the steps of:

irradiating intense light to a first semiconductor film to form a second semiconductor film;

irradiating laser light to the second semiconductor film to form a third semiconductor film having a plurality of convexes;

20 and

irradiating intense light to the third semiconductor film to form a fourth semiconductor film.

8. A method for manufacturing a semiconductor device according to claim 7, wherein the intense light is irradiated from above the substrate, from below the substrate or from above and below the substrate.

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9. A method for manufacturing a semiconductor device according to claim 7, wherein the intense light is selected from the group consisting of infrared light, visible light and ultraviolet light.

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10. A method for manufacturing a semiconductor device according to claim 7, wherein the intense light is light emitted from a lamp selected from the group consisting of a halogen lamp, a metal halide lamp, a xenon arc lamp, carbon arc lamp, high-pressure sodium lamp or high-pressure mercury lamp.

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11. A method for manufacturing a semiconductor device according to claim 7, wherein an atmosphere within a process chamber when irradiating the intense light is a reducing gas.

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12. A method for manufacturing a semiconductor device according to claim 7, wherein the laser light is emitted a laser selected from the group consisting of an excimer laser, a YAG laser, a YVO₄ laser, YAlO₃ laser and YLF laser.

13. A method for manufacturing a semiconductor device comprising the steps of:

providing a first semiconductor film with a metal element
5 for promoting crystallization;

performing a heating process on a first semiconductor film to form a second semiconductor film;

irradiating laser light to the second semiconductor film to form a third semiconductor film having a plurality of convexes;
10 and

irradiating intense light to the third semiconductor film to form a fourth semiconductor film.

14. A method for manufacturing a semiconductor device
15 according to claim 13, wherein the intense light is irradiated from above the substrate, from below the substrate or from above and below the substrate.

15. A method for manufacturing a semiconductor device
20 according to claim 13, wherein the intense light is selected from the group consisting of infrared light, visible light and ultraviolet light.

16. A method for manufacturing a semiconductor device according to claim 13, wherein the intense light is light emitted from a lamp selected from the group consisting of a halogen lamp, a metal halide lamp, a xenon arc lamp, carbon arc lamp, high-pressure sodium lamp or high-pressure mercury lamp.

17. A method for manufacturing a semiconductor device according to claim 13, wherein an atmosphere within a process chamber when irradiating the intense light is a reducing gas.

18. A method for manufacturing a semiconductor device according to claim 13, wherein the laser light is emitted a laser selected from the group consisting of an excimer laser, a YAG laser, a YVO₄ laser, YAlO₃ laser and YLF laser.

19. A method for manufacturing a semiconductor device according to claim 13, wherein the metal element is one or a plurality of elements selected from Fe, Co, Ni, Ru, Rh, Pd, Os, Ir, Pt, Cu, Ag, Au, Sn and Sb.

20. A method for manufacturing a semiconductor device comprising the steps of:

providing a first semiconductor film with a metal for promoting crystallization;

irradiating intense light to the first semiconductor film
to form a second semiconductor film;

irradiating laser light to the second semiconductor film
to form a third semiconductor film having a plurality of convexes;

5 and

irradiating intense light to the third semiconductor film
to form a fourth semiconductor film.

21. A method for manufacturing a semiconductor device
10 according to claim 20, wherein the intense light is irradiated
from above the substrate, from below the substrate or from above
and below the substrate.

22. A method for manufacturing a semiconductor device
15 according to claim 20, wherein the intense light is light selected
from the group consisting of infrared light, visible light and
ultraviolet light.

23. A method for manufacturing a semiconductor device
20 according to claim 20, wherein the intense light is emitted from
a lamp selected from the group consisting of a halogen lamp,
a metal halide lamp, a xenon arc lamp, carbon arc lamp,
high-pressure sodium lamp and high-pressure mercury lamp.

24. A method for manufacturing a semiconductor device according to claim 20, wherein an atmosphere within a process chamber when irradiating the intense light is a reducing gas.

5 25. A method for manufacturing a semiconductor device according to claim 20, wherein the laser light is emitted from a laser selected from the group consisting of an excimer laser, a YAG laser, a YVO₄ laser, YAlO₃ laser and YLF laser.

10 26. A method for manufacturing a semiconductor device according to claim 20, wherein the metal element is one or a plurality of elements selected from Fe, Co, Ni, Ru, Rh, Pd, Os, Ir, Pt, Cu, Ag, Au, Sn and Sb.

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